

DFD2-S instructions.

After completing assembly, carefully inspect all of your solder connections, and the polarity of the diodes, voltage regulator, the electrolytic capacitor, and the IC's.

Adjust the contrast control fully counter-clockwise. Apply power from 8 to 18VDC. You should see some frequency displayed. Adjust the contrast control for the desired effect.

The top zero ohm jumper selects 100Hz resolution (jumper off) or 10Hz resolution (jumper on)

The bottom zero ohm jumper selects display format (where USB is used as an example of the operating mode display):












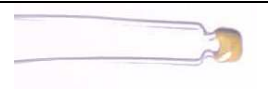


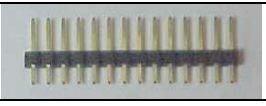
10 Hz resolution: 12.345.67MHz USB (jumper off) or 12.345.670 USB (jumper on)

100Hz resolution: 12.345.6 MHz USB (jumper off) or 12.345.600 USB (jumper on)

Using the LED back-lit display [\(see diagram below\)](#)

The back-lit module has a block of LEDs behind the LCD display. It is powered from terminals A (anode) and K (cathode) with A being plus and K being minus (usually ground). The voltage drop across the LEDs is 4VDC. The current can range from 20ma. To 150ma. The dropping resistor required is $R = (V-4)/I$ where I is the desired current and V is the supply voltage.

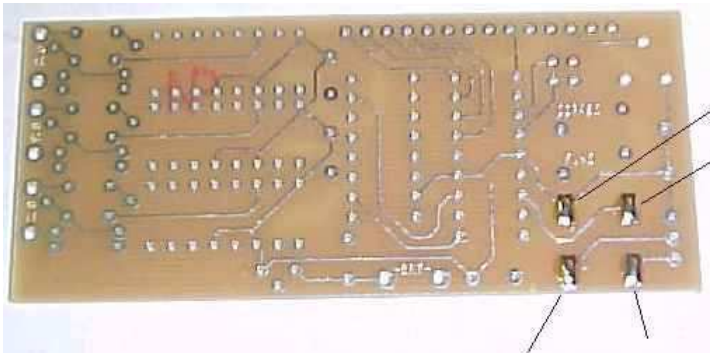
PARTS LIST

D1, D2, D3, D4, D5, D6	1N4148		U1, U2, U3	74HC4046	
R1	100ohms Brown-black-brown		U4	74HC153	
R2, R3	1000 ohms brown-black-red		U5	PIC16C71 Labeled according To the model DFD2	
			U6	78L05 Voltage regulator	
R4	10K trimpot contrast control adjust fully CCW		U7	20MHz TCXO	
	25 Turn trimpot value may vary		H1	2 pin header 2 Pin jumper	
C1, C2, C3 C4, C5, C6 C7, C8, C11	.1uF C1, 4 and 6 Mislabeled on schematic		J1	Female connector	
C12	10uF		P1	Male connector	

Use pins 1-14 of the display module. If 16 pads are available, last two are not used. Backlit option is powered by supplying current (a current limiting resistor **MUST be used) from the A(anode) to K(cathode) connections on the edge of the module. **See schematic for details.****

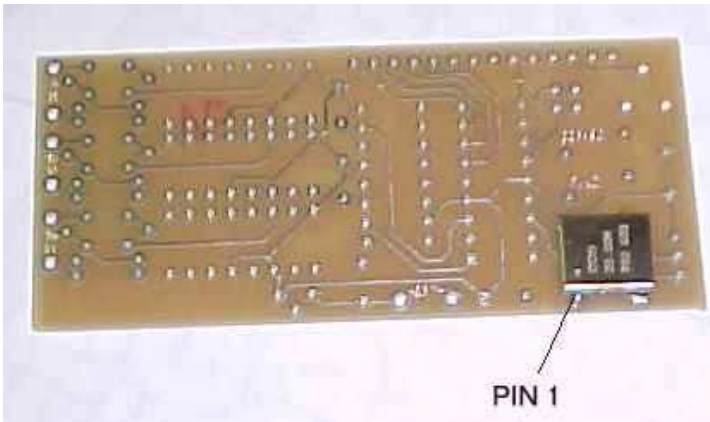


DFD2 assembly instructions.

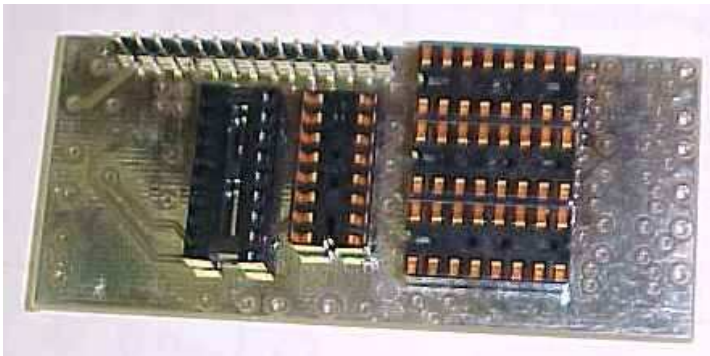


Begin by placing solder globs on the four rectangular pads for the surface mount TCXO.

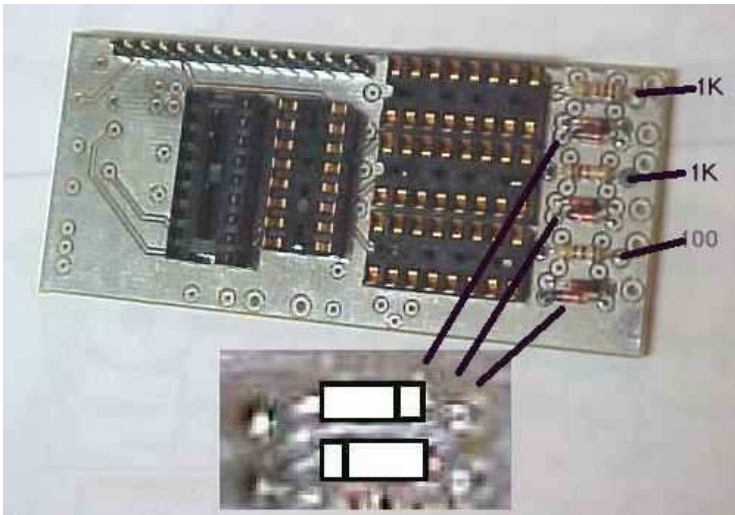
If I pre-installed the TCXO, I did test it but If unit displays only 8 black squares then check and reflow the solder on its four corners.



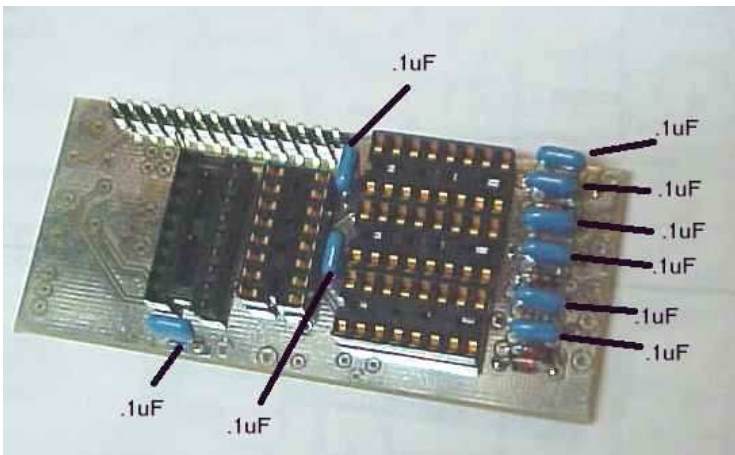
Carefully Position the TCXO with pin 1 as shown and remelt the solder globs while pushing down on that side of the device until all four pads of the TCXO are soldered. You can check by looking at the edge view to verify that solder has flowed onto the TCXO terminals. If later the unit shows only 8 black squares on the display it may be because one or more of these terminals did not properly reflow solder.



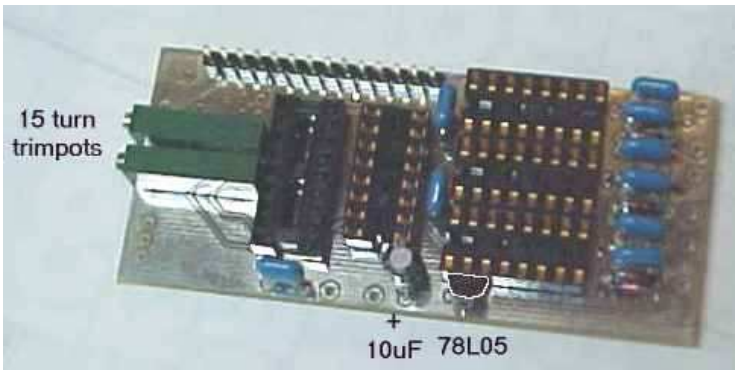
Next mount the IC sockets and display header.



Next install and solder all resistors and the six back to back diodes.

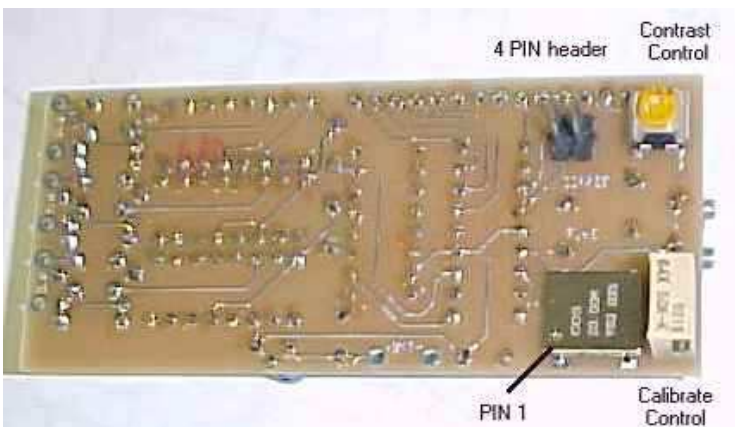


Then install and solder 9 each .1 uF capacitors **Caps can be blue or brown.**

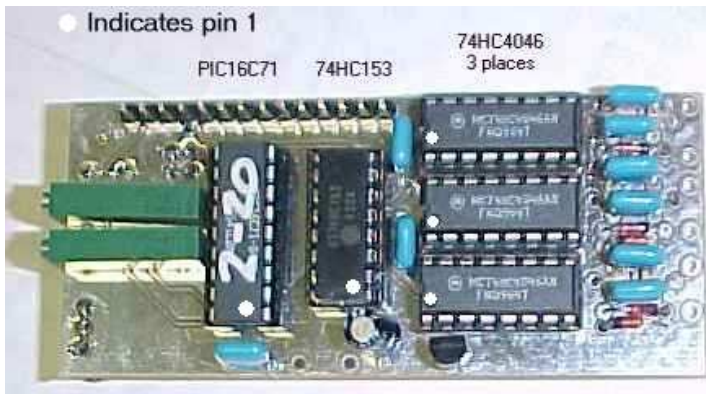


Next install the 78L05 voltage regulator, the 10uF electrolytic. **The two 15 turn trim pots are not used.**

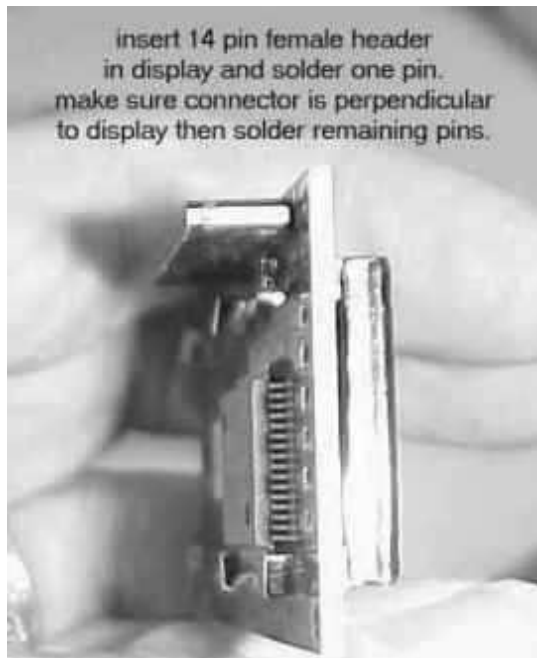
+ Terminal of 10uF electrolytic in hole closest to edge of PCB. Flat side of 78L05 toward IC sockets.



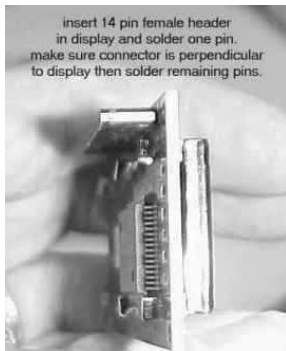
On the back side of the PCB install and solder the 10K contrast control (**adjust it fully CCW**) and the 25K calibration control.



Next, Install the ICs.



Mount the 14 pin female header on the display module soldering only one pin. Then verify the connector is at a right angle to the module, remelting the soldered pin and adjusting the connector if necessary. Then solder the remaining pins. Plug the module into the DFD2 PCB. At this point you can plug the counter board into the module and power them with a 9 volt battery. You should see something displayed. What you see at this point is not important as some inputs are still floating until final assembly in your enclosure. **If this is a general purpose DFD2 then set the IF offset by adjusting the 15 turn trimpots. Then install the 74HC4046 chips.**



Mount the 14 pin female header on the display module soldering only one pin. Then verify the connector is at a right angle to the module, remelting the soldered pin and adjusting the connector if necessary. Then solder the remaining pins. Plug the module into the DFD2 PCB. At this point you can plug the counter board into the module and power them with a 9 volt battery. You should see something displayed.

What you see at this point is not important as some inputs are still floating until final assembly in your enclosure. **Set the IF offset by adjusting the 15 turn trimpots. Then install the 74HC4046 chips.**

If only 8 black squares appear, either the TCXO has not been soldered on all 4 points or there is a solder problem on the circuits between the 18 pin chip and the display connector, or on the display module connector.

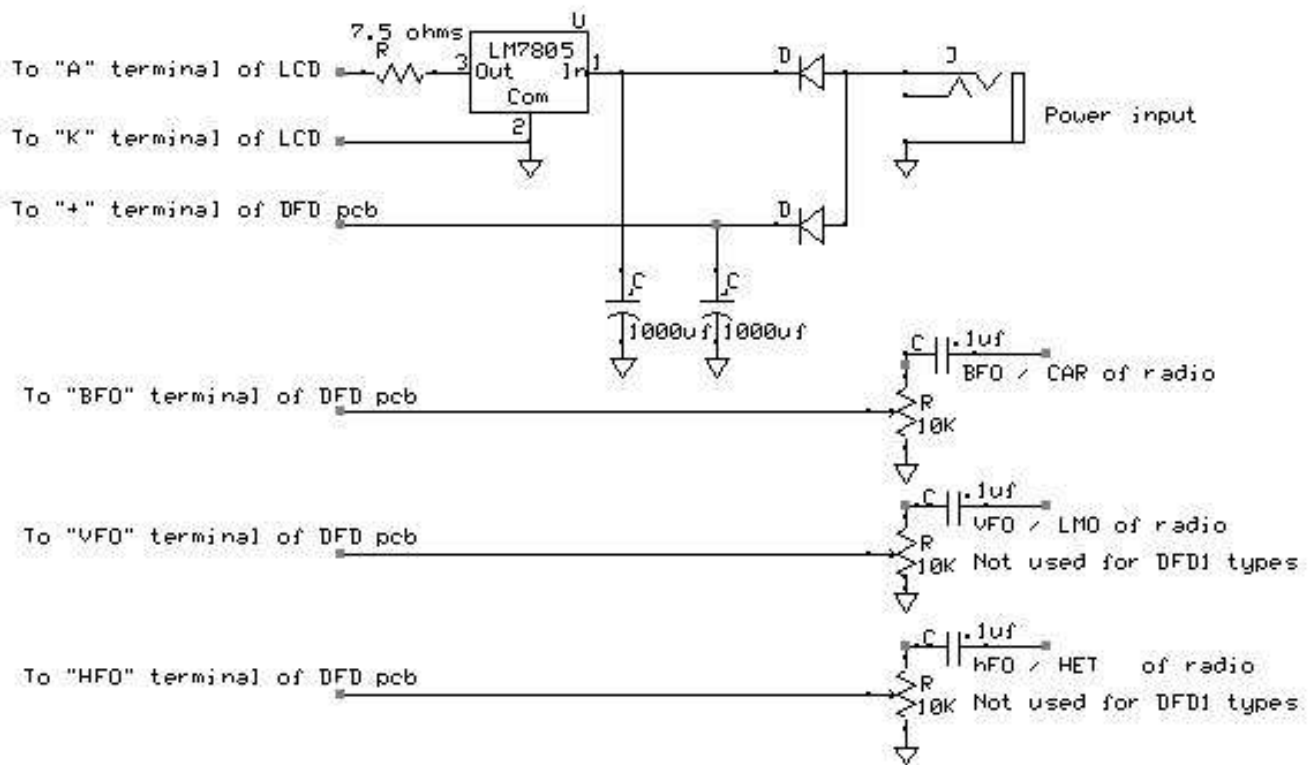
CALIBRATION

- There are many ways to calibrate a frequency counter depending on available test equipment.
- The simplest is to zero beat a signal generator against WWV (receiver bfo off) while measuring the generators frequency with the counter.
 - Adjust the 25 turn trimpot on the back of the PCB to obtain the WWV frequency (20 MHz) on the counters display.
 - Or listen to TCXO on receiver while zero beating it to WWV on 20MHz.
- Any other KNOWN frequency can also be used.

Installation

It is possible to overdrive the inputs causing erratic frequencies to be displayed. A 10K trimpot can be used to set the levels going into the DFD2.

the levels should be set only slightly greater than required for a stable display. Set the BFO input first, then the VFO and finally the HFO (usually on 10mtr band).



Power Conditioning module for DFD1 and DFD2 applications

This is the power conditioning module supplied as part of the plug-n-play fully assembled digital dials. Something similar is recommended for DFD2 applications to provide level controls.

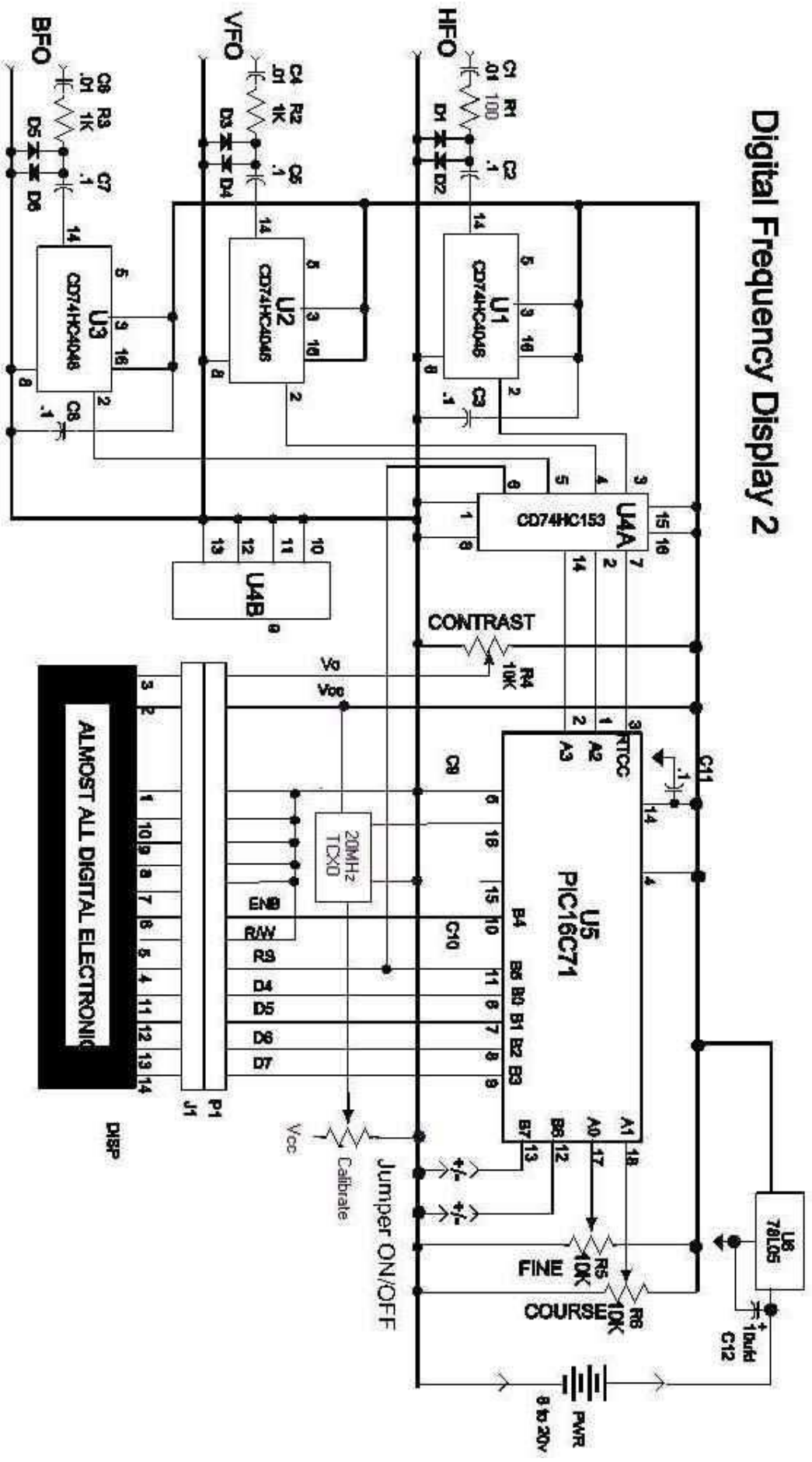
Only one input is required for a DFD1.

The 7805 part is to power a backlit display option.

For additional installation hints see

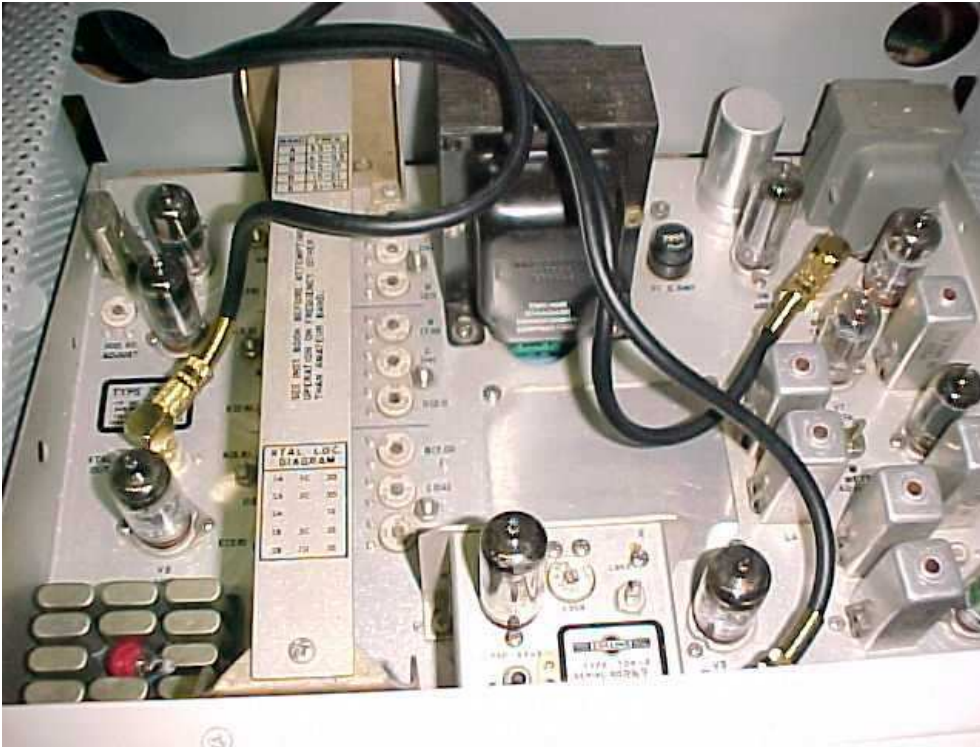
<http://www.aade.com/applications2/app2.html>

Digital Frequency Display 2



DISP

Collins S line



75S-1 Receivers

Connect a black cable from the BFO Test jack to the BFO input. .

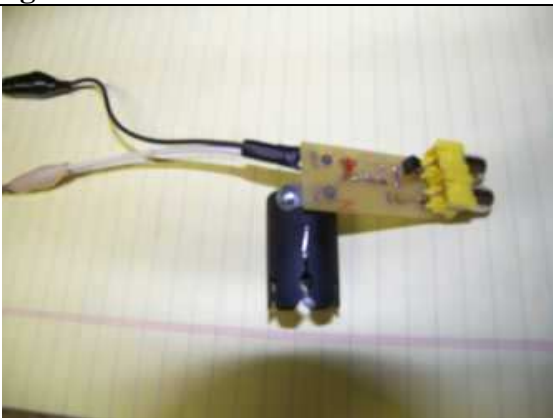
Connect a black cable from the VFO Output to the VFO input.

Connect the black cable from the XTAL Osc. Output to the HFO input.

Get 6.3VAC from pin 8 of the power connector and route it to the power input jack of the C75S. No ground is needed. A grey cable is provided if you wish to use it. **IMPORTANT: POWER SOURCE SHOULD BE OFF BEFORE CONNECTING TO DIGITAL DISPLAY OR IT COULD BE SHORTED.**

75S-2/3

Use tube shield probe for the BFO input. You can attach the probes power clip to the hot side of the pilot light socket and run an RCA cable to the C-75S



Using one of the probes, slip the tube shield over the crystal (V8) BFO oscillator tube.

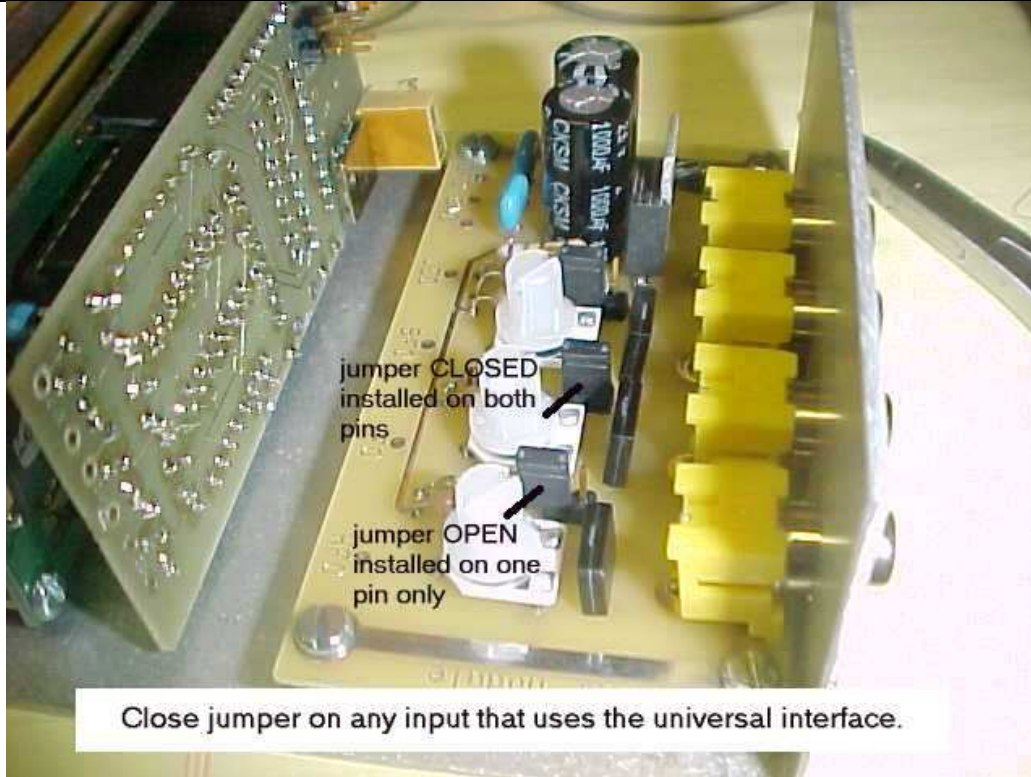
Clip the ground wire to a nearby spot on the chassis

Connect a black cable from the RCA connector to the C75S/DFD2-S BFO input.

You could also make a direct connection to pin 8 of V8 similar to that shown for the KWM2.



clip the power wire to the hot side of the pilot light socket (clip off alligator and solder for a more permanent connection)
 connect the grey cable from the RCA connector to the power input of the digital dial.
 similar to shown on my 75S-1



When using the universal interface you must change the jumpers on the power module board from OPEN to CLOSED, for all inputs that use the universal interface, as shown.

Close jumper on any input that uses the universal interface.

When used with a 32S transmitter you must use “Y” connections in the cables from the 75S to the 32S and C-75S display.

KWM-2

Use two tube shield probes

Using one of the probes, on tube V11 and slip the tube shield over the tube

Clip the ground wire to a nearby spot on the chassis

Connect a cable from the RCA connector to the C75S/DFD2-S BFO input.

Using the second probe, on tube V13 and slip the tube shield over the tube.

Clip the ground wire to a nearby spot on the chassis

Connect a cable from the RCA connector to the C75S/DFD2-S HFO input.

Connect a third cable from the EXTERNAL VFO jack on the rear panel to the VFO input.

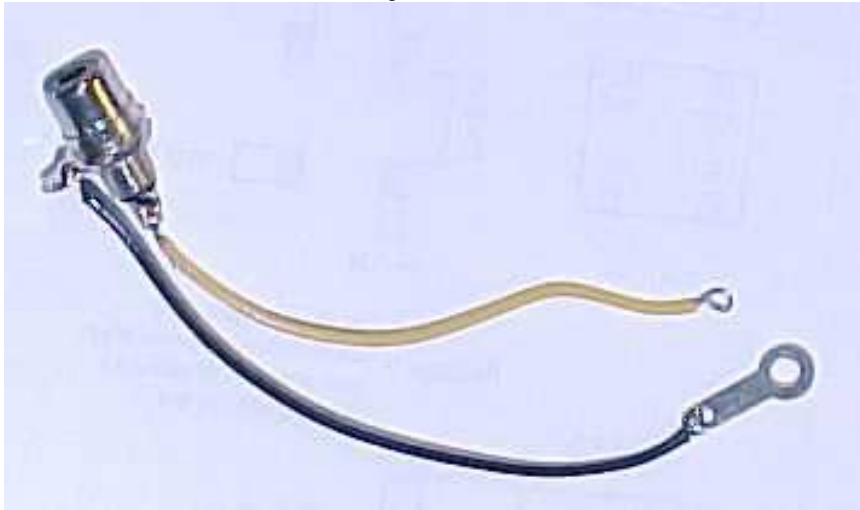
If you are using an external VFO you will need a T connector.

Connect appropriate power to the C75S power jack. Anything from 9 to 18 volts DC or 6.3V to 12.6VAC.

DFD2 requires 9 to 18VDC.

you can attach the probes power clip to the hot side of the pilot light socket socket and run an RCA cable to the C-75S

OPTIONALLY you can make direct connections



- Fabricate two RCA jack adapters similar to shown above. The center pin connects to a wire loop that will fit snugly over a tube pin, the shell connects to a solder lug. (Length of the wires will depend on the users installation requirements.)

Using one of the adapters, remove tube V15 and slip the loop over pin 9 then plug the tube back in. (Make sure cannot short to adjacent pin or ground)

Ground the shell, solder lug, at the right front corner screw on the final amplifier shield.

Connect a cable from the RCA connector to the C75S/DFD2-S BFO input.

Using the second adapter, remove tube V6 and slip the loop over pin 3 then plug the tube back in.

Thread the ground strap and the RCA connector through the tube shield and replace the shield.

(These will probably come out of the top of the shield)

Remove the nut from the screw beside V13 and put the ground lug over the screw and replace the nut.

Connect the cable from the RCA connector to the C75S/DFD2-S HFO input.

Connect a third cable from the EXTERNAL VFO jack on the rear panel to the VFO input.

If you are using an external VFO you will need a T connector.

Connect appropriate power to the C75S power jack. Anything from 9 to 18 volts DC or 6.3V AC.

(C75S contains a rectifier filter)

DFD2 requires 9 to 18VDC.

JUMPER OPTIONS and ADJUSTMENTS

There are two plug-on jumpers on the PC board inside the unit.

To access these jumpers on the C75, remove the screw from the bottom of the unit and slide the chassis out of the cabinet.

They are small black plastic jumper plugs that are plugged on four pins on the PCB.

- The top jumper selects either 10Hz resolution (jumper on) or 100Hz resolution (jumper off).
- The bottom jumper selects how the frequency is displayed
- Bottom jumper ON
 - 10Hz resolution would display as 12.345.670 USB (as shipped)
 - 100Hz resolution would display as 12.345.600 USB
- Bottom jumper OFF
 - 10Hz resolution would display as 12.345.67MHz USB
 - 100Hz resolution would display as 12.345.6 MHz USB
- **ADJUSTMENT (If using the power conditioning module)**
 - Tune to the highest frequency you will use and peak the PRESELECTOR.
 - Set the mode switch to LSB. If the display does not read LSB, turn the BFO control CW until the mode reads correct, then turn it a little more.
 - Set the mode switch to USB and repeat the above.
 - If the frequency is not reading correctly, turn both the VFO and XTAL controls fully CCW. The display will be reading the BFO frequency when the mode switch is set to SSB, or 455 if the mode is AM. The 455 is in software, there is no BFO in AM mode.
 - Turn either control until the display reads a different frequency and is stable, then turn it a little more.
 - Turn the other control until the display reads the correct frequency, then turn it a little more.
 - Try some other bands to be sure the display reads correctly on all bands. If a band is found that is not reading correctly, turn the XTAL control CW a little more. (Remember to keep the preselector tuning at the proper band on the radios panel)

For more very interesting information on DFD2 or C75 from Tony, I0JX see <http://www.qsl.net/i0jx/dfd.html>

and for more of his neat stuff <http://www.qsl.net/i0jx>

. **KWS-1 (Using DFD2-KWS) needs a special chip available free when ordering.**

- The hook-up is straight forward,
- BFO tube shield probe connected to V104 (see picture above from KWM2 instructions),
- VFO to VFO Injection jack J203 and
- HFO to Crystal Injection jack J205.